the procedure for IIa) to give the corresponding polyurethane diol (IIb).

The reactant (IIb) once again contained no isocyanate groups. The number of average molecular weight of (IIb) was 1067 g/mol.

EXAMPLE 4

131.5 g (0.07 mol) of reactant (Ia), 54.25 g (0.07 mol) of the polyurethane diol (IIa) and 0.4 g tin (II) dioctanoate (Metatin Kat. S26 from the company ACIMA AG, Buchs) as trans-esterification catalyst were introduced into a 500 ml 4-neck flask with stirrer, internal thermometer, nitrogen inlet, distillation bridge with condenser and vacuum connection. The reactants were melted by heating to 180° C. over 30 minutes, and mixed together by concurrent stirring. Once a clear melt was obtained, a vacuum of 0.7 torr was applied to the apparatus. The melt temperature was then adjusted to 210° C. over 20 min and to 220° C. over a further 15 min. It could be seen that the viscosity of the melt increased as a result. The polycondensation was ended 5 min after reaching 220° C. The clear melt of the resultant block polyurethane-amide was poured into cold water and thus solidified.

The polymer had a DSC melting point of 158° C. and a relative viscosity of 1.467.

During the preparation of this block polyurethaneamide, 9.85 g n-hexan-1-ol (n-hexanol) and 0.4 g hexane-1,6-diol were distilled off, as was apparent from the gas-chromatographic analysis of the distillate. The given amount of the n-hexanol distilled off corresponded to 68.5% trans-esterification reaction.

EXAMPLE 5

In the same manner as in Example 4, 131.5 g (0.07 mol) of the component (Ia) and 74.7 g (0.07 mol) of the polyurethane diol (IIb) were subjected to polycondensation in the presence of 0.4 g tin (II) dioctanoate. A block polyurethane-amide was thus obtained, which melted at 157° C. and had a relative viscosity of 1.477. This polymer is more flexible than that of Example 1.

The amount (10.35 g) of n-hexanol distilled off during the preparation of the block polyurethane-amide gave a change of 72% for the trans-esterification. In addition to the n-hexanol, 0.4 g hexane-1,6-diol was also recovered in the distillate.

While only a limited number of specific embodiments of the present invention have been expressly disclosed, nonetheless, it is to be broadly construed and not to be limited except by the character of the claims appended hereto.

What we claim is:

1. A method for the preparation of block polyurethane amides in a melt by the reaction of

(a) a linear polyamide having terminal carboxylic acid ester groups and which melts at not more than 210° C.; and

(b) a polyurethane having hydroxyl groups at its chain ends;

at a temperature of 160° C. to 240° C., and in the presence of a trans-esterification accelerator.

2. The method of claim **1** wherein said polyamide and said polyurethane are in substantially equimolar amounts.

3. The method of claim **2** wherein said polyamide and said polyurethane are first blended homogeneously above their melt temperatures, and then polycondensed by transesterification.

4. The method of claim **1** wherein said accelerator is a catalyst used in preparation of said polyamide.

5. The method of claim **1** wherein said reaction is batchwise and takes place in an autoclave.

6. The method of claim **1** wherein said reaction takes place under reduced pressure.

7. The method of claim **1** wherein said reaction is a continuous, thin-layer condensation.

8. The method of claim **1** wherein said polyamide has a number average molecular weight of from 500 to 12,000 g/mol. determined by end group analysis.

9. The method of claim **8** wherein said molecular weight is 900 to 5,000 g/mol.

10. The method of claim **1** wherein said polyamide is the reaction product of a polyamide-forming component and a dicarboxylic acid, esterified by a primary aliphatic alcohol.

11. The method of claim **10** wherein said component is taken from the class consisting of (a) lactams and ω-aminocarboxylic acids having 6 to 12 carbon atoms, and (b) equimolar amounts of a dicarboxylic acid having 6 to 13 carbon atoms and a diamine having 6 to 18 carbon atoms.

12. The method of claim **10** wherein said component is caprolactam, laurolactam, dodecanelactam, aminocaproic acid, 11-aminoundecanoic acid, or 12-aminododecanoic acid.

13. The method of claim **10** wherein said dicarboxylic acid has 6 to 36 carbon atoms.

14. The method of claim **13** wherein said dicarboxylic acid is adipic acid, terephthalic acid, isophthalic acid, azelaic acid, sebacic acid, dodecanedioic acid, brassidic acid, or dimerized fatty acids.

15. The method of claim **10** wherein said primary alcohol has 4 to 8 carbon atoms.

16. The method of claim **15** wherein said primary alcohol is n-butanol, n-hexanol, n-octanol, or 2-ethyl-1-hexanol.

17. The method of claim **1** wherein said accelerator is Sn(II), Sn(IV), or Zr compounds.

18. The method of claim **17** wherein said accelerator is Sn(II) oxide, Sn(II) salts of monocarboxylic acids, dibutyltin oxide, n-butyltin acid, or $Zr(OR)_4$, wherein R is alkyl having 1 to 4 carbon atoms.

19. The method of claim **1** wherein said polyurethane is the reaction product of at least one diisocyanate and at least one diol.

20. The method of claim **19** wherein said diisocyanate has its isocyanate groups bonded to an aliphatic, aromatic, or cycloaliphatic carbon atom.

21. The method of claim **20** wherein said diisocyanate is hexamethylene-1,6-diisocyanate; 2,2,4-trimethylhexamethylene-1,6-diisocyanate; 2,4,4-trimethylhexamethylene-1,6-diisocyanate; decamethylene-1,10-diisocyanate; dodecamethylene-1,12-diisocyanate; 3-isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate; cis-or trans-cyclohexane-1,4-diisocyanate; or bis(4-cyanocylohexyl)methane.

22. The method of claim **19** wherein said diol is aliphatic, cycloaliphatic, or aromatic and carries a primary hydroxyl group.

23. The method of claim **22** wherein said diol is butane-1,4-diol; hexane-1,6-diol; 2,2,4-trimethylhexane-1,6-diol; 2,4,4-trimethylhexane-1,6,diol; 2,2 dimethylpropane-1,3-diol; decane-1,10-diol; dodecane-1,12-diol; diethylene glycol; triethylene glycol; α, ω-dihydroxypolytetramethylene oxide; α, ω-dihydroxypolyethylene oxide having a number average molecular weight